

# **Guide for Expendable Launch Vehicle Payload Processing at the Kennedy Space Center and Cape Canaveral Air Force Station**



**APPROVAL PAGE**

Guide for Expendable Launch Vehicle Payload Processing  
At the Kennedy Space Center and Cape Canaveral Air Force Station

//Original Signed by//  
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## **SECTION 1. INTRODUCTION**

### **1.1 PURPOSE OF THIS GUIDE**

This document guides the National Aeronautics and Space Administration (NASA) customer launching on an Expendable Launch Vehicle (ELV). It explains the planning process necessary to prepare a spacecraft for launch at the Cape Canaveral Air Force Station (CCAFS). Many federal, state, and local regulations govern the operations necessary to prepare spacecraft at the launch site. In addition, the customer has a unique set of processing requirements to satisfy before launch.

The customer should use this Guide as a reference for understanding the process, as a resource for defining the ground processing requirements specific to their spacecraft, and as a tool to discuss the implementation of their requirements with the Kennedy Space Center (KSC) Launch Site Integration Manager (LSIM). The aim is to provide a systematic approach to developing safe and efficient launch site plans within the necessary guidelines.

### **1.2 STRUCTURE OF THE GUIDE**

The Guide consists of this introduction (section one), three main sections, and the appendices. Section two defines applicable launch site organization and documentation, including the description and purpose of the Launch Site Support Plan (LSSP). This is the information a new customer needs to lay the foundation for working at KSC/CCAFS.

Customers familiar with KSC/CCAFS launch site processing may want to use section two simply as a reference, and skip ahead to sections three and four to get the latest on launch site requirement information. Section three discusses the planning requirements to prepare the customer for arrival at KSC/CCAFS (badges, training, etc.) Section four discusses activities performed by the customer while at KSC/CCAFS; these are spacecraft dependent, and the LSIM works with the customer to identify them during the development of the LSSP.

### **1.3 REVISION AND CONTROL**

This document falls under configuration control by the KSC Launch Site Integration Branch. To ensure you have the latest version of this Guide or to make comments and corrections, contact the assigned LSIM or the office listed below:

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## **SECTION 2. ON YOUR MARK: THE STARTING POINT**

### **2.1 INTRODUCING THE KSC MISSION INTEGRATION TEAM (MIT)**

[<http://www.ksc.nasa.gov/elv/mit.htm>]

Planning for spacecraft ground processing begins when a customer requests that NASA launch their spacecraft or when NASA provides the funding. When NASA Headquarters notifies KSC that the ELV Mixed Fleet Manifest authorizes the launch of the spacecraft, KSC assigns a unique MIT.

The MIT consists of four NASA KSC ELV members: 1) The Mission Integration Manager (MIM), 2) the Integration Engineer (IE), 3) the Launch Services Manager (LSM), and 4) the LSIM. Together, the MIT members provide total management of the mission integration process by working with, and serving as the primary point of contact (POC) for the spacecraft customer and the Launch Service Provider (LSP). Each member of the MIT has specific tasks to accomplish to ensure that the customer's ground processing and launch occur as safely and smoothly as possible.

#### **2.1.1 Mission Integration Manager**

The MIM serves as the primary customer interface for mission specific integration. The MIM chairs the MIT providing overall mission management for technical items, contract deliverables, budget, schedules, etc. Specifically, the MIM performs the following:

- a. Co-chairs Mission Integration Working Group (MIWG) meetings with the LSP.
- b. Approves mission-unique items and budget for LSP items.
- c. Serves as the delegated Contracting Officer's Technical Representative (COTR) for mission-unique items provided under contract with the LSP.
- d. Approves contract deliverables after coordination and review by the MIT.

#### **2.1.2 Integration Engineer**

The IE brings launch vehicle engineering expertise to the MIT; and works closely with the NASA KSC ELV Chief Engineer, Launch Vehicle Lead Engineer, Mission Analysts, and other NASA ELV Launch Vehicle engineering branches. In addition, the IE performs the following:

- a. Assumes responsibility for the technical content of the Mission Specification and other technical documents.
- b. Leads the resolution of technical issues on the Program, and identifies issues to engineering management that require an Engineering Review Board.
- c. Works with the launch vehicle resident offices and the Launch Vehicle Lead Engineer to organize and accomplish hardware/software reviews.

### **2.1.3 Launch Services Manager**

The LSM performs program and business management for the launch service contracts. The LSM works closely with NASA KSC procurement and finance specialists. The LSM also performs the following:

- a. Assesses programmatic impacts and changes across the fleet.
- b. Serves as the COTR and primary interface to the LSP for core vehicle items.
- c. Authorizes, reviews, and provides business assessment of early mission studies, task orders, change orders, and mission-unique items.

### **2.1.4 Launch Support Integration Manager**

The LSIM brings launch site processing expertise and knowledge of processes and services to the MIT. The LSIM performs advanced planning and technical oversight of launch site spacecraft processing. The LSIM relies on a launch site integration team to implement customer requirements (see section 2.2 for a description of this team). Specifically, the LSIM performs the following:

- a. Serves as the spacecraft customer advocate to the MIT, and shares spacecraft impacts to mission integration with the MIT.
- b. Supports early planning meetings and spacecraft reviews with the customer; and assists the customer in defining launch site requirements, and documents them in the LSSP (see section 2.3 for more on the LSSP).
- c. Ensures the customer meets launch site requirements, and provides the necessary supporting documentation.
- d. Seeks to continually make improvements to launch site processing for the benefit of the customer.
- e. Assigns facilities and resources, and provides launch site budget projections to support the ELV manifest.
- f. Coordinates with the Range to ensure spacecraft test and launch support.
- g. Ensures the integration of spacecraft activities into launch vehicle schedules, and supports dress rehearsals and launch countdown.
- h. Co-chairs Launch Management Coordination Meetings (LMCM's), and coordinates input from the customer, MIT, and Range.

## **2.2 THE WHO'S WHO GUIDE OF LAUNCH SITE INTEGRATION TEAM MEMBERS**

The launch site integration team implements the requirements specified in the LSSP. It consists of those KSC individuals accomplishing tasks in support of the customer's

requirements. During the planning process and once on site, there are several primary individuals of this team working with the customer: 1) The LSIM, 2) Customer Processing Support Manager (CPSM), 3) Launch Site Support Engineer (LSSE), and 4) Facility Manager. The following subsections describe the responsibilities of these key interfaces at KSC/CCAFS.

### **2.2.1 More About The LSIM**

The LSIM coordinates the KSC planning effort, serving as the interface to the customer to receive, track, negotiate, and document the commitments for KSC to fulfill the customer's ground processing requirements. Once the customer is on site, the LSIM ensures the launch site integration team implements his requirements. The LSIM, CPSM, Facility Manager, and other support personnel, as required, attend the customer's daily spacecraft processing meetings to gain an understanding of his plans and needs. At these meetings, the customer should discuss the support he requires for upcoming activities. The LSIM and CPSM provide the customer with information about other center activities that might impact his operations (e.g., nearby facility closures, controlled burns, resource conflicts, emergency preparedness (hurricane) protective measures, etc.). The LSIM and CPSM will serve as the customer's advocates to resolve these issues and minimize the impact on his processing schedule.

The LSIM also provides the customer with insight into NASA ELV launch operations and preparatory activities. The LSIM works closely with the LSP to accommodate coordination between the processing activities of the launch vehicle and the spacecraft. When the spacecraft moves to the launch pad, the LSIM continues to support the implementation of the customer's requirements. The LSIM works launch day management plans with the customer and KSC management, scheduling the reviews and preparing briefings.

### **2.2.2 Customer Processing Support Manager**

The CPSM is the customer's POC during daily operations at the KSC/CCAFS Payload Processing Facility (PPF) and/or Hazardous Processing Facility (HPF). The CPSM supports and schedules all preplanned activities, operational support, and requirements, working closely with the LSIM during the planning stages to discuss how to best meet the customer's needs; and assures that the right support is there when required. In addition, the CPSM works with the Facility Manager for all requirements specific to the facility equipment and services such as the PPF temperature and humidity operating levels, cranes, doors, etc. The CPSM co-locates with the customer at the facility so he always has a NASA KSC representative on hand.

### **2.2.3 Launch Site Support Engineer**

The LSSE helps the LSIM to define the customer's requirements in terms of the supporting organizations required to implement them. The LSSE takes the requirements from the LSSP and develops a spacecraft-unique Program Requirements Document (PRD) through which the applicable support organizations commit to the required support. The LSSE assures KSC resources can support the capabilities requested by the customer. The LSSE brings issues to the attention of the LSIM for resolution. The LSIM's signature on the LSSP assures the customer of KSC's commitment to meet his requirements. Although the customer may not interface directly with the LSSE, he may meet him at the planning meetings with the LSIM.

### **2.2.4 Facility Manager**

The Facility Manager knows the ins and outs of the PPF/HPF that the customer calls home during his stay at KSC/CCAFS. Located at the facility, he will assist the customer with the operation of the facility systems and equipment including cranes, doors, environmental controls, etc. The Facility Manager works closely with both the LSIM and the CPSM to understand and implement the customer's facility requirements. They inform the customer of any service or maintenance items which must occur to maintain the facility in proper condition.

## **2.3 WHAT IS A LSSP AND WHY DO WE NEED ONE?**

The LSSP is an agreement between the NASA LSIM, the spacecraft customer representative, and the LSP as to the products and services necessary for successful, cost-effective launch site processing at KSC/CCAFS facilities.

The LSIM develops and publishes an LSSP for the customer's spacecraft. They work with the customer to document his processing plans, needs, and responsibilities while at KSC/CCAFS. The LSIM's signature on the LSSP indicates KSC's commitment to provide the specific resources and to perform the tasks necessary to satisfy the customer's requirements. The customer's signature on the document indicates awareness of, and compliance with, applicable policies that govern launch site processing at KSC/CCAFS. It shows the customer's agreement with plans for the use of KSC/CCAFS facilities and the resource commitments.

The process of developing an LSSP begins as early as two years before the customer's launch date. Generally, the LSIM prepares two generations of an LSSP, a preliminary and a baseline. The preliminary LSSP is a working copy; the preliminary LSSP is signed, but it does not contain the final commitments to satisfy the customer's requirements. The LSIM publishes the baseline LSSP approximately six months before



launch. The customer and the LSIM sign the baseline issue that includes all final requirements and commitments.

A timeline for the development of the customer's LSSP should be discussed with the LSIM as soon as possible.

## **2.4 THE RULES (LAUNCH SITE DOCUMENTATION REFERENCE LIST)**

The customer has prime responsibility for spacecraft assembly, test, and servicing while processing at KSC/CCAFS. However, there are rules to abide by. The following list of documents provides the guidance a customer needs to complete a successful launch campaign at KSC/CCAFS. He can obtain the current issue of the following documents from the LSIM. The customer discusses any points of concern or confusion with the LSIM.

### **A. Launch Site Requirements Documentation**

1. EWR 127-1                      *Range Safety Requirements*
2. KHB 1710.2D                *KSC Safety Practices Handbook*
3. KHB 1860.1C                *KSC Ionizing Radiation Protection Program*
4. KHB 1860.2B                *KSC Non-Ionizing Radiation Protection Program*
5. KHB 2570.1                  *KSC Radio Frequency Spectrum Management Handbook*
6. KHB 8800.7C                *Waste Management Handbook*
7. KMI 1800.2C                *KSC Hazard Communication Program*
8. KMI 1860.1D                *Radiation Protection Program*
9. K-STSM-14.2.1D           *KSC Payload Facility Contamination Control Requirements/Plan*
10. NASA-STD-8719.8        *Expendable Launch Vehicle Payload Safety Review Process Standard*

### **B. Launch Site Reference Documentation**

1. 29CFR1910-1200        *OSHA Hazard Communication Standard*
2. 49CFR171-180           *Department Of Transportation Regulation*
3. Applicable to PPF       *Facility Standard Interface Drawings*
4. KCA-013                   *Memorandum of Agreement on Operation of Firex Water Deluge Systems in Payload Processing Facilities*
5. KCI-HB-5340.1C        *Payload Facility Contamination Control Implementation Plan*
6. K-CM-05.3.1             *Guide for Expendable Launch Vehicle Payload Processing*

*at KSC and Cape Canaveral Air Force Station*

7. KHB 1040.1G *Hurricane Preparation and Recovery Plan Annex H*
8. KHB 1610.1B *KSC Security Handbook*
9. KHB 8800.7C *Hazardous Waste Management Handbook*
10. KMI 1800.2C *KSC Hazard Communication Program Handbook*
11. K-STSM-14.1.1 *Facilities Handbook for Building AE*
12. K-STSM-14.1.7 *Facilities Handbook for Spacecraft Assembly and Encapsulation Facility Number 2*
13. K-STSM-14.1.8 *Facilities Handbook for Radioisotope Thermoelectric Generator Storage Building*
14. K-STSM-14.1.12 *Facilities Handbook for Vertical Processing Facility*
15. K-STSM-14.1.15 *Facilities Handbook for Payload Hazardous Servicing Facility*
16. K-STSM-14.1.17 *Facilities Handbook for Multi-Payload Processing Facility*
17. NHB 1620.3 *NASA Security Handbook*
18. NHB 2410.9A *NASA Automated Information Security Handbook*

C. Launch Service Provider and Range Documentation

1. Delta *Delta Launch Vehicle Secondary Payload Planner's Guide for NASA Missions*
2. Delta *Payload Planner's Guide for Medium-Lite Payloads*
3. Launch Vehicle PRD *Expendable Launch Vehicle Program Requirements Document*
4. LM 96-01 *TITAN/ATLAS Hurricane Implementation Plan*
5. MDC G1665 *Delta II Complex 17 Spacecraft Accommodations Guide*
6. Vehicle Specific *Launch Service Provider Accommodations Guide*
7. Vehicle Specific *Launch Service Provider Severe Weather Implementation Plan*

## 2.5 PLANNING MEETINGS AND REVIEWS

The LSIM and members of the launch site integration team work with the customer to define and finalize the processing flow through the launch site facilities. They meet

with him to discuss spacecraft activities, requirements, services, and resolution of issues. The customer should plan and budget for the necessary travel to KSC to support these meetings and reviews.

Although not totally inclusive, the following subsections describe some of the meetings and reviews requiring customer and KSC participation. In all reviews, the customer must identify any problems that may affect processing and launch.

### **2.5.1 Ground Operations Working Group (GOWG) Meetings**

Most likely, the customer's first meeting at the launch site is the GOWG. The LSIM arranges and chairs this meeting to discuss launch site items of interest to the customer, and to establish a working relationship with him. Attendance typically includes the customer and their contractors, members of the KSC launch site integration team and any other NASA personnel, NASA contractors, and any government agencies that are involved with launch support.

### **2.5.2 Mission Integration Working Group Meetings**

The MIWG meetings are designed to facilitate the entire Spacecraft/Launch Vehicle integration process. The meetings focus on the definition, documentation, implementation, and status of the spacecraft-to-launch vehicle interface requirements. Mission-unique, first-flight items, vehicle modifications, and other contractual items are discussed at the MIWG meetings. Typically, the meeting location will rotate between the Spacecraft Project, Spacecraft Contractor, LSP, and launch site.

### **2.5.3 Technical Interchange Meetings (TIM's)**

As firm working relationships are established between the customer and the launch site integration team members, the function of the GOWG's begins to transform into smaller meetings. These TIM's involve more specialized agendas that are focused on specific topics such as:

- a. definition of requirements for documentation
- b. unique safety issues and concerns
- c. designation and assignment of particular or unique interfaces with facilities
- d. procedure development/review
- e. detailed discussion of receiving/handling customer-unique hardware
- f. resolution of schedule conflicts
- g. integration meetings

### **2.5.4 Safety Reviews**

For all ELV spacecraft, the customer submits (through the LSIM) a Missile Systems Prelaunch Safety Package (MSPSP) to the Eastern Range and to the KSC ELV Flight Assurance Division. Details of the MSPSP development process can be found in NASA-STD-8719.8, *Expendable Launch Vehicle Payload Safety Review Process Standard*. The LSIM sets up meetings for the customer with participants from KSC and the Eastern Range as required in order to help the customer produce the MSPSP. Safety issues and concerns can be addressed in working groups and TIM's. It is never too early to begin this process.

The review of the MSPSP occurs in three stages during the same timeframe as the customer's spacecraft reviews: 1) The Preliminary Design Review (PDR), 2) the Critical Design Review (CDR), and 3) the Pre-ship Review. The customer should submit each version of their MSPSP at least 45 days prior to their safety review meetings, scheduled by the LSIM. The customer should plan to submit the final MSPSP at least 75 days prior to hardware shipment to KSC/CCAFS. For detailed information about the contents of the MSPSP, see the Eastern and Western Range Regulations (EWR) 127-1, *Range Safety Requirements*. Please note that prior to commencing payload ground operations, the MSPSP must be approved by the appropriate authority.

### **2.5.5 Daily Status and Scheduling Meetings**

These meetings begin upon customer arrival for processing at KSC/CCAFS, summarize the previous day's activities, and serve as a forum for planning and scheduling future activities. The customer and the CPSM co-chair these meetings at the PPF or conference room area at a time designated by the customer. Some customers choose to continue the meetings with the CPSM throughout the launch campaign in order to handle PPF support items, such as communications needs at the PPF after the spacecraft has moved to the launch pad. The LSP chairs a daily status and scheduling meeting as the time approaches for the spacecraft mate with the launch vehicle. The LSP usually holds this meeting near the launch complex.

### **2.5.6 Ground Operations Review (GOR)**

The Director of the ELV Programs Office chairs the GOR approximately 30 days prior to the primary spacecraft hardware arrival at KSC/CCAFS. The review members verify that KSC facilities, services, and personnel are ready to receive and process the flight hardware. They discuss open items and assign action items as necessary. At the review, the customer presents spacecraft status (including any anomalies or open items), a spacecraft summary, and a readiness statement to ship flight hardware and support spacecraft processing at KSC/CCAFS.

### **2.5.7 Launch Management Coordination Meeting**

The LSIM co-chairs the LMCM along with the NASA KSC ELV Launch Director. They hold the meeting with the customer the day before mission dress rehearsal. The objective is to review all aspects of the launch countdown process with key personnel to ensure that the launch team is knowledgeable, ready; and trained for the dress rehearsal and launch.

### **2.5.8 Flight Readiness Review (FRR)**

The FRR is held approximately 5 days prior to launch. This review covers any changes that have occurred since the NASA Headquarters Mission Readiness Review. The NASA KSC Launch Director and Flight Assurance Manager co-chair this review with participation from the LSP and the spacecraft customer. It establishes that the launch vehicle and the mission support are ready to proceed as scheduled. The customer presents any open spacecraft items with plans for closure and provides a launch readiness statement.

### **2.5.9 Launch Readiness Review (LRR)**

The LRR is held the day prior to launch. This review verifies the closing of all action items and authorizes approval to proceed with launch countdown. The Spacecraft Mission Director chairs the LRR with participation from the NASA KSC Launch Director and the LSP. The customer presents closure of all spacecraft items and provides a launch readiness statement. At the end of the review, the customer signs the Certificate of Flight Readiness with NASA ELV, Safety, and LSP management.

## **2.6 DEFINING PROCESSING REQUIREMENTS AND CUSTOMER DELIVERABLES**

The customer and the LSIM define all of the processing requirements during development of the LSSP. Integration and test requirements include physical integration, interface and verification testing, servicing, and calibration. Support requirements include services and facility-related support such as power, environmentally-controlled integration areas, office space and furniture, security, handling equipment, communication equipment, and photography. For each requirement, the LSSP provides a place to document KSC's commitment to meet that requirement. As previously mentioned, KSC provides the commitments in the baseline LSSP and not the preliminary LSSP.

In addition to defining requirements, KSC needs documentation from the customer to demonstrate his ability to meet the KSC/CCAFS rules (section 3 goes into more detail on these requirements). KSC calls these "customer deliverables". Table 2-1 attempts to provide the customer with a list of the deliverables KSC needs and the timeframe in which they are needed. The LSIM should be contacted with any questions.

**Table 2-1. Customer Deliverable Items**

<b>ITEM</b>	<b>REQUIREMENT</b>	<b>SUBMITTAL TIME</b>
Provide Briefing Info for Program Introduction and Range Tailoring	EWR 127-1	18 - 24 months prior to arrival
Submit Draft Missile System Prelaunch Safety Package	EWR 127-1	Post PDR
Provide Input to Publish Preliminary LSSP	K-CM-05.3	18 months prior to arrival
Provide Input to Publish Baseline LSSP	LSSP Template	15 months prior to arrival
Submit Non-Standard Security Requirements (COMSEC, RTG's, etc.)	KHB 1610.1B	14 months prior to arrival
Submit Non-Standard Contamination Requirements	K-STSM-14.2.1D	14 months prior to arrival
Submit Personnel Badging Info for Foreign Nationals (PRP input)	K-CM-05.3	12 months prior to arrival
Submit RF Authorization Form	KHB 2570.1	4 months prior to arrival
Submit Use Authorization Documentation (ionizing & non-ionizing)	K-CM-05.3	12 months prior to arrival
Identify and Submit Program Assignment of Single POC for Waste Management	K-CM-05.3	12 months prior to arrival
Submit Final Information for EIS (AF Form 813)	Cal EPA	12 months prior to arrival
Submit Preliminary MSPSP	EWR 127-1	Post CDR
Submit Personnel Badging Info for Non-Foreign Nationals (PRP input)	K-CM-05.3	6 months prior to arrival
Submit Administrative Network Information Checklist	Payload Specific	4 months prior to arrival
Deliver Deployment Plan to Resident Office	Payload Specific	4 months prior to arrival
Submit Final List of all Customer Procedures	EWR 127-1	90 days prior to arrival
Submit PWQ's	KHB 8800.7C	60 days prior to arrival
Submit MSDS's	KMI 1800.2C	60 days prior to arrival
Submit Final MSPSP	EWR 127-1	75 days prior to hardware shipment
Participate in Pre-Ship Review (T-Con) and Submit Final Arrival Day Badging Request	Payload Specific	45 days prior to arrival
Submit Final Arrival/Transportation Plans and Schedules	K-CM-05.3	45 days prior to arrival
Submit Hurricane Plan (if not part of LSSP)	KHB 1040.1G	45 days prior to arrival
Submit Ground Operation Review Charts to KSC (LSIM)	LSIM	45 days prior to arrival
Submit Waste Management Training Memo	K-CM-05.3	30 days prior to arrival
Participation in Ground Operation Review	K-CM-05.3	30 days prior to arrival
Final Submittal of all Medical Certifications	K-CM-05.3	30 days prior to arrival
Ensure MSPSP Approval	NASA-STD-8719.8/EWR 127-1	30 days prior to arrival
Maintain Solvent Log	SBCEPA	upon arrival
Submit Pad Contingency Off-load Procedure	EWR 127-1	45 days prior to payload transport to pad
Submit Hazardous Customer Standalone Procedures	K-CM-05.3	55 days prior to first use
Submit Personnel Training Class Dates	K-CM-05.3	30 days prior to need date
Submit Non-hazardous Customer Standalone Procedures	K-CM-05.3	10 days prior to first use
Submit Camera Pass Request (for CCAFS only)	KMI 1610.1B	2 weeks prior to need
Submit Permits for Welding/Hot Work (if needed)	KHB 1710.2D	1 week prior to need

### 2.6.1 Launch Site Service Capabilities

During development of the LSSP, the LSIM and the customer's project office jointly define the tasks and agree that NASA should fund them. Prior to providing services, KSC submits planning and budget estimates of reimbursements to the program and project offices during normal NASA program operating plan cycles. For any late requirement(s) that have not been submitted in the normal budget cycle, the customer's project office must fund the desired service(s). Typical basic support package services and facilities include the following:

- a. Spacecraft and Ground Support Equipment (GSE) Arrival and Departure from Launch Site. This service includes the use of the KSC/CCAFS landing sites, waterways, and roadways. KSC provides crash/fire support and normal turnaround service for landing and takeoff of the user-provided cargo aircraft for delivery and return shipment of the spacecraft/spacecraft-related equipment. KSC does not include the cost of fueling for aircraft, ships, or trucks in their standard budget estimates. KSC does provide packing and crating of flight hardware and GSE for return to the customer's facility, if desired.
- b. Transportation and GSE Handling. KSC provides transportation to and between the processing facilities at KSC/CCAFS of the spacecraft and the spacecraft GSE from aircraft, trucks, or barges using government handling equipment and personnel per KHB 1610.1B, *KSC Security Handbook*.
- c. Communications. KSC provides radio frequency (RF) communications, hardwire data lines, and voice communications between the customer's ground station in the PPF and the pad. Existing closed circuit television may be used in the PPF.
- d. Security. KSC includes the normal 24-hour-a-day KSC/CCAFS perimeter security, escort security, and the access control intrusion detection system for automated entry control in the PPF/HPF. KSC locks facilities at other times. When required by the spacecraft customer, KSC can provide additional security service. This cost will be passed along to the customer.
- e. Environmental Control. KSC maintains all KSC-controlled facilities in industrial environmental condition, as described in the K-STSM-14.2.1D, *KSC Payload Facility Contamination Control Requirements/Plan*.
- f. Propellants and Gases. KSC provides small quantities of in-stock gaseous nitrogen, liquid nitrogen, gaseous helium, isopropyl alcohol, and other similar materials, as well as personnel for handling. KSC can provide larger quantities of these materials, plus hydrazine family fuels, nitrogen tetroxide, and other propellants as a non-standard service. KSC discourages customers from bringing their own hypergolic propellants to KSC due to the complications of transportation, storage, and liability. For a complete listing of routinely available commodities, containers, and services, visit the KSC Propellants website at <http://www.lo.ksc.nasa.gov/services/propellants/prophome.htm>. The customer



must provide ordnance. KSC provides hazardous materials disposal service, which must be coordinated with KSC in advance.

- g. Sampling and Analysis. KSC includes sampling and analysis for up to 25 samples. Additional charges apply for larger requirements.
- h. Photographic Services. Typically, KSC provides the customer with duplicate negatives and a contact sheet so they can process prints at their own facility. Exposures are made on 35 mm color film. If requested, KSC can provide color/black and white prints (12.7 cm x 17.8 cm (5 in x 7 in) and 20.3 cm x 25.4 cm (8 in x 10 in)) and slides. NASA KSC Public Affairs records video footage, also available upon request, on BETA SP tape, from which they produce 1.27 cm (.5 in) VHS copies for the customer. KSC assesses excessive photo support requests (more than 125 prints) to determine if an additional charge applies. Digital camera support is also available.
- i. Documentation. KSC prepares an LSSP and a PRD to respond to the customer's launch site requirements. KSC translates the customer's requirements into the appropriate documentation to obtain these services.
- j. Office Space and Equipment. Dependent upon the PPF assignment, KSC provides office space and equipment to the customer as available at the time of spacecraft processing (30 desks are typical).
- k. Safety. The 45 Space Wing (45 SW) and KSC safety offices review and approve the MSPSP and launch/processing procedures, and monitor hazardous spacecraft operations as appropriate.
- l. Emergency Medical Services and Fire Protection. KSC/CCAFS furnishes emergency medical services and fire protection. These services include review of physical data for spacecraft personnel (i.e., crane operations or propellant handlers).
- m. Test Equipment. KSC furnishes use of available NASA test and monitoring equipment as required.
- n. Recalibration. KSC provides equipment recalibration services for up to ten components on a non-interference basis.
- o. Technical Shops Support. KSC furnishes up to 10 hours of unplanned shop support available on a non-interference basis.
- p. Propellant Handlers Ensemble (PHE) Suits. KSC Life Support Services provides these suits for the purpose of handling toxic fuels. KSC requires medical certification and training for use of these suits.
- q. Ordnance Storage and Handling. Typical services include support for receiving inspection, bridge wire check, leak test, X-ray, and delivery to an HPF. KSC usually provides storage of ordnance at KSC/CCAFS for approximately 2 months, and storage of each set of spares for up to 6 months. Long-term storage will be on a space-available basis and may involve a service charge.

- r. Technical Library Services. KSC includes the use of the KSC technical library.
- s. Launch Site Management. KSC includes the cost of coordination and planning for all spacecraft-related launch site support.
- t. Payload Processing Facility. KSC furnishes up to 12 weeks of occupancy and routine operations, maintenance, and utilities. Additional weeks may be made available by NASA to accommodate special needs or problems that occur at the launch site.
- u. Mission Director's Center (MDC). KSC provides the use of the KSC MDC (in Building AE) for 2 days during and after countdown. KSC can also arrange for use of the MDC on a non-interference basis for support of mission simulation activities.
- v. Hazardous Processing Facility. KSC furnishes up to 8 weeks of occupancy (concurrent with PPF occupancy) for routine hazardous operations, maintenance, and utilities. If KSC assigns a HPF as a combination PPF/HPF, the 12-week occupancy applies to the HPF. Additional weeks may be made available to NASA to accommodate special needs or problems that occur at the launch site.
- w. Fairing Processing Facility. KSC includes the utilization of a processing facility for fairing processing and cleaning operations.
- x. Upper Stage Processing Facility. KSC includes the utilization of a processing facility for an upper stage, if required.

## 2.6.2 Mission-Unique Agreements

The LSSP also documents major agreements established between KSC and the customer during development of the LSSP, which are applicable to spacecraft ground processing and launch operations. Typical customer agreements include the following:

- a. extra cleanliness requirements
- b. special temperature and/or humidity requirements
- c. special purge requirements (limited down times, use of special purge gases)
- d. special transportation requirements (oversized loads, higher-than-normal vibration sensitivity, purges required during transport)
- e. special handling guidelines (RF restrictions within processing facility, out-of-the-ordinary weight or height restrictions)
- f. payload-unique training needed for access to processing areas
- g. payload-unique facility requirements (increased door width, additional storage space, additional office space, updated phone systems, additional conference capabilities)
- h. special gases/commodities
- i. use of KSC personnel support for off-line processing (fueling, alignments, machining, non-destructive evaluations)

- j. use of special Work Time Policy
- k. use of special Tool Control Plan
- l. special safety restrictions or waivers
- m. special security requirements
- n. RF attenuation/exposure monitoring
- o. special personnel protection requirements
- p. extensive administrative network support

KSC lists any requirements that remain unresolved at the time of LSSP publication as open items. The LSIM tracks these items to ensure resolution. The LSSP also tracks items that have a standard completion date beyond the publication date of the baseline LSSP. See section 2.3 for more on the LSSP.

### **SECTION 3. GET SET: PREPARING FOR ARRIVAL AT THE LAUNCH SITE**

This section identifies generic requirements applicable to spacecraft processing levied by KSC. This information is not duplicated in the published LSSP; however, the customer agrees to abide by these KSC requirements when he signs the LSSP. Refer to appendix B for a quick reference to the requirements provided in this section.

#### **3.1 ACCESS TO THE CENTER AND THE CUSTOMER'S WORK AREAS (BADGE PROCESS)**

[<http://www.ksc.nasa.gov/elv/badging.htm>]

KSC Security issues temporary picture badges (also called machine badges; reference KHB 1610.1B, chapter 504) to spacecraft customers for the duration of their processing flow. The following subsections describe the information required to obtain a machine pass depending on whether the customer is a NASA employee, contractor employee, or Foreign National.

Once obtained, the machine pass provides general access to KSC/CCAFS at any center entrance gate for the period of time stated on the badge. Access to controlled areas where processing takes place requires the machine pass, a need to participate in the processing, and an additional badge called a Temporary Area Authorization (TAA). KSC also describes the TAA process in this section. While the badges described in this section would allow personnel into a particular area, additional conditions may be applied to limit access to only those personnel specifically required to support a test or other activity.

##### **3.1.1 General Access for NASA Employees**

NASA personnel need only show their NASA picture identification badge in order to gain access to KSC/CCAFS. However, KSC recommends that visitors coordinate with either their resident office at KSC, the Payload Customer Coordination Specialist (mail code VB-E2, phone (321) 867-2829), or the assigned LSIM prior to the intended arrival date at KSC. NASA badges must be worn above the waist while on center.

##### **3.1.2 General Access Machine Passes for Contractor Employees**

Contractors should coordinate their visit with either their NASA center's resident office at KSC, the Payload Customer Coordination Specialist (mail code VB-E2, phone (321) 867-2829), or the assigned LSIM at least 5 working days prior to the intended arrival date at KSC. They need to provide the following information:

- a. complete name, including middle initial
- b. social security number
- c. company name where employed
- d. company address

- e. purpose of visit
- f. areas to visit (contact the LSIM for information regarding areas you need to access)
- g. dates of visit
- h. KSC POC (name of the person with whom you intend to meet)

The contractor picks up the temporary machine pass prior to entering the base at one of two Pass and Identification Buildings: 1) the CCAFS entrance, Gate 1 or 2) the KSC entrance, Gate 3, located on State Road 405 in Titusville (just pass the U.S. 1 overpass). The gates are open from 6 a.m. to 5 p.m., Monday through Friday. The customer must show a picture identification to receive the badge. He should also wear his temporary pass above the waist while on base.

### **3.1.3 General Access Machine Passes for International Visitors**

International visitors should coordinate their visit with either the resident office at KSC for the NASA center they support, the Payload Customer Coordination Specialist (mail code VB-E2, phone (321) 867-2829), or the assigned LSIM at least 45 days in advance of the visit. International visitors need to provide the following information:

- a. complete name, including middle initial
- b. social security number (for Canadians)/passport number for others
- c. company name where employed
- d. company address
- e. purpose of visit
- f. areas to visit (contact the LSIM for information regarding areas you need to access)
- g. dates of visit
- h. KSC POC (name of the person with whom you intend to meet)
- i. place and date of birth
- j. country of citizenship

The visitor picks up the temporary machine pass prior to entering the base at one of two Pass and Identification Buildings: 1) the CCAFS entrance, Gate 1 or 2) the KSC entrance, Gate 3, located on State Road 405 in Titusville (just pass the U.S. 1 overpass). The gates are open from 6 a.m. to 5 p.m., Monday through Friday. The visitor must show a picture identification to receive the badge. He should wear his temporary pass above the waist while on base.

### **3.1.4 Temporary Area Permits Overview**

Most KSC/CCAFS facilities require an area permit for access. The customer's resident office, the Payload Customer Coordination Specialist, or the LSIM can issue the customer TAA permits and electronic access cards (where required). KSC issues pink TAA's to indicate escorted access and yellow TAA's to indicate unescorted access.

Prior to issuance of the unescorted access TAA (yellow), the customer must complete training courses and a certification process called Personnel Reliability Program (PRP) for US citizens, and Accreditation must be completed for Foreign Nationals. See the following section for a description of PRP, and see section 3.2 for area training requirements. If the customer does not have time to complete the process, if he cannot meet the requirements for both the training and the investigation, or if he requires only infrequent access, KSC issues a "to-be-escorted" TAA (pink). KSC requires one of their properly badged coworkers to escort them.

### **3.1.5 Unescorted Access/Personnel Reliability Program**

KHB 1610.1B details the KSC unescorted access PRP requirements. Under this program, unescorted access requires an authorization and certification through the NASA PRP.

The customer should allow at least 6 months to complete the PRP process and obtain his clearance. Because this is a time and labor-intensive process, KSC advises the customer to pursue this type of access only for those requiring unescorted access on a daily basis. Generally, KSC prefers written notification listing those who require PRP. This notification should be sent to the customer's resident office, the Payload Customer Coordination Specialist, or the LSIM.

Employees of other NASA centers and their contractor employees can obtain PRP certification from the center at which they work. The KSC Security Office can authorize unescorted access based on either of the following:

- a. Written confirmation of PRP certification by the employing center, including:
  1. full name
  2. date and place of birth
  3. social security number
  4. date the screening was completed/favorably evaluated
  5. name of screening program
  6. a passport, visa, or alien registration number (for Foreign Nationals only)

OR

- b. Completion of screening based on the submittal of the following forms at least 6 months prior to the need date:
  1. KSC Form 20-87, *Request for Investigation and Unescorted Access Badge*
  2. KSC Form 20-90, *KSC Badge and Area Permit Investigation Data Form*
  3. NASA Form 531, *Name Check Request*
  4. FD 258, *Fingerprint Chart*

After the customer delivers the completed forms to their resident office, the Payload Customer Coordination Specialist, or the LSIM, the forms will be submitted to the KSC Security Office for processing.

### **3.1.6 Unescorted Access for Foreign Representatives**

Unescorted access may be authorized for foreign representatives (i.e., Foreign Nationals and United States (U.S.) citizens employed by or representing a foreign concern) if accreditation is on file with NASA. The customer shall provide the names (and same information listed above) for any individuals who will require this unescorted access to their resident office, the Payload Customer Coordination Specialist, or the LSIM. Upon verification of accreditation, receipt of completed training, and receipt of KSC Form 20-181, *Foreign National Security Questionnaire*, KSC Security may authorize unescorted access for operational needs in spacecraft processing controlled areas. KSC must exclude all other controlled areas at KSC. The customer should work with the LSIM if foreign visitors require unescorted access to the launch complexes at CCAFS, because this requires additional coordination by the LSIM.

## **3.2 TRAINING REQUIREMENTS**

[<http://www.ksc.nasa.gov/elv/training.htm>]

[<http://aztec.ksc.nasa.gov/ecweb/AreaAccessMatrix.pdf>]

All customer training requirements must be scheduled through the Launch Site Integration Branch or the customer's resident office at KSC at least 30 days prior to the need date. Consolidated training requirements should be provided, in writing, with the following information:

- a. the number of trainees
- b. the full names of trainees
- c. the trainee's social security/passport number
- d. the company name and location
- e. the courses required, including certifications
- f. the requested training date
- g. the completion need date

The LSSP documents the types of KSC-provided training requested by the customer. In some instances, the customer must undergo medical clearance before completing training. Here is a sample of available KSC-provided courses:

- a. operational access to KSC, CCAFS, and facilities
- b. crane training (for PPF cranes only)

- c. PHE training
- d. working-at-heights training

### **3.2.1 Access Requirements**

Any processing area at KSC requires all unescorted users to be trained in such areas as Clean Room Operations, Safety Awareness, Emergency Procedures, and Facility Familiarization. Reference the Training Requirements Matrix shown in table 3-1 for the list of courses required for each area. KSC offers most training courses on video that can be taken prior to arrival at the launch site. Upon completion, the training is valid for 3 years. A notable exception is the Emergency Life Support Apparatus (ELSA) training for hazardous facilities that requires use of the ELSA equipment on site and is valid for only one year.

### **3.2.2 Learning to Use Our Cranes**

Customer personnel who operate cranes in NASA-controlled PPF's must complete the KSC medical requirements, the KSC crane operator course, the applicable on-the-job training package; and must be licensed for crane operation. The LSP provides crane support at the launch pads.

### **3.2.3 Operational Training**

Customer personnel who utilize KSC systems must complete the required training on that system. The following are some examples, although not a complete list:

- a. Customers using KSC facility communications boxes must participate in Operational Intercommunication System-Digital training.
- b. KSC requires customer personnel that perform spacecraft fuelling to complete the KSC-provided certification course, and to use the NASA-provided PHE suits.
- c. Customer personnel who operate facility doors in their spacecraft processing areas in a KSC facility must complete the applicable KSC-provided operator's course.
- d. The LSIM and the facility manager will coordinate processing facility exterior door operations in CCAFS facilities. The LSP provides CCAFS launch pad exterior door support.

### **3.2.4 CCAFS Station Launch Complex Training**

Unescorted access to the various CCAFS space launch complexes (SLC's) requires training. Table 3-1 contains these training requirements (look at the column labeled for the appropriate launch complex (e.g., SLC-17 Pads A/B, SLC-36 Pads A/B, SLC-40, SLC-41)). Officially, KSC requires pad walkdowns the first time only (recertification is accomplished by viewing a video). However, a walkdown is a great refresher of the



**Table 3-1. Training Requirements Matrix**

COURSE NUMBER	DESCRIPTION	O&C HIGH BAY, MPPF	SSPF	PHSF, VPF, SAEF- 2,	SLC 17	SLC 36	SLC 40	SLC 41	CCAFS AE CLEAN ROOM	LIQUID PROP STAGE AREA	ORD STAGE AREA
QG07CKSC	ELSA Training	X	X	X	X	X	X	X		X	X
QG109KSC	KSC General Processing Safety	X	X	X						X	X
QG100CAS	CCAFS General Processing Safety				X	X	X	X		X	X
QF28XKSC	Industrial Area Familiarization	X	X	X							
QG106CAS	ITL Orientation						X	X			
QF17PCAS	SLC-17 Safety Familiarization				X						
QG117CAS	SLC-17 Walk Down				X						
QF40PCAS	SLC-40 Safety Familiarization						X				
QW29DCAS	SLC-40 Walk Down						X				
QF41PCAS	SLC-41 Safety Familiarization							X			
QW29ECAS	SLC-41 Walk Down							X			
QF36PCAS	SLC-36 Safety Familiarization					X					
QG136CAS	SLC-36 Walk Down					X					
QF200KSC	Liquid Propellant Storage Facility									X	
QG223KSC	Anhydrous Ammonia Hazard		X								
QC312CAS	Clean Room Operations								X		
QS205LSK	How Clean is Clean Enough?	X	X	X					X		
XG219KSC	Clean Room Entry	X	X	X					X		

work area, and KSC recommends it prior to beginning each launch campaign. The customer's training should be coordinated with their resident office at KSC or the LSIM.

### **3.3 CAMERA PERMITS**

[<http://www.ksc.nasa.gov/elv/cameras.htm>]

Use of cameras at KSC or in controlled areas must be for official purposes. Camera permits are not required in PPF's; however, KSC may prohibit flash photography.

The United States Air Force (USAF) does permit photography within CCAFS restricted or controlled areas if the applicable squadron commander or designated representative is physically present. Otherwise, the individual taking the photographs must have a letter signed by the squadron commander or designated representative giving permission for that individual to take photographs in the restricted or controlled areas. Information concerning the use of photographic equipment on CCAFS is available from the customer's resident office, the Payload Customer Coordination Specialist, or the LSIM.

### **3.4 CUSTOMER FEEDBACK PROCESS**

#### **3.4.1 Overview**

The Customer Feedback Process is an on-going initiative to meet the needs of our changing environment. Through the Customer Feedback process, we are attempting to maximize customer satisfaction by fulfilling our customer's needs, wants, and expectations. During the customer's process flow KSC will be gathering expectations and doing exit interviews. The feedback process will help to strengthen NASA, NASA customers, and the NASA-Supplier relationships by opening communications and removing barriers while improving the process flow.

#### **3.4.2 Process Flow**

Since the transfer of the ELV Program Office to KSC, the process flow has been revised to include the mission initiation (Phase I), the overall mission integration flow (Phase II), and the launch site activities (Phase III).

- a. **Phase I** is the initiation of the concept and development of a mission. The KSC ELV Program Office becomes involved during the Announcement of Opportunity development, and follows the process until the Mission Contract is awarded. At the end of Phase I, KSC will do an exit interview with their customers to determine what could be changed to make Phase I more effective. In addition, KSC will be collecting expectations for Phase II. These expectations will enable KSC to provide better support in Phase II.

- b. **Phase II** is the development of the spacecraft, launch vehicle, and required interfaces. The KSC ELV Program Office will be coordinating the integration between the Payload Customer and the LSP to ensure all aspects are discussed during the build-up phase of the spacecraft and launch vehicle. At the end of Phase II, an exit interview will be held with the customers and LSP's. This information will allow further optimization of the integration flow. In addition, KSC will be collecting expectations for Phase III. These expectations will enable KSC to provide better support in Phase III.
- c. **Phase III** is the integration of the spacecraft to the vehicle through launch. During each processing flow, KSC will contact the spacecraft customer and LSP to establish communication. After launch, an exit interview will be conducted to help measure the performance of both KSC and the LSP.

### 3.4.3 Feedback

Feedback will be provided to our Spacecraft customers and LSP's identifying areas for future improvements in Phase I, Phase II, and Phase III.

## 3.5 CUSTOMER DATA

KSC requires the customer to provide the LSIM with data related to spacecraft processing to ensure capability development, resource scheduling, and other launch site planning. Examples of data the LSIM typically requests from the customer are as follows:

- a. Identify spacecraft access points requiring access during ground processing (in order for KSC to assess whether access can be provided). Data shall include drawings (to scale and with dimensions) that describe spacecraft access requirements in launch vehicle coordinates.
- b. Identify spacecraft processing requirements/operations that require or affect hazardous ground processing and testing at KSC. Data shall include drawings and procedures that may aid in the development of KSC hazardous spacecraft processing documentation.
- c. Provide a description of GSE (e.g., size, weight, physical envelope, facility interface connectors/pin functions, and test configuration) to be delivered for use within KSC facilities. The test support equipment footprint and descriptions need to be provided to ensure proper support within the KSC/CCAFS facilities. Any customer-provided propellant container shall meet Department of Transportation (DOT) regulation (49CFR171-180), or have a processed KSC Safety waiver if regulations cannot be satisfied.
- d. Submit customer-generated technical operating procedures to be performed at KSC/CCAFS no later than 55 days before first use for assessment of potential

hazards and compatibility with facilities and operations tasks. Applicable KSC and Eastern Range spacecraft operations personnel review and approve submitted procedures prior to usage by the customer.

- e. Provide a list of all hazardous materials (including ordnance items as defined in KMI 1800.2C, *KSC Hazard Communication Program Handbook*) being delivered to NASA facilities.

### **3.5.1 More About Customer-Generated Technical Operating Procedures**

As stated above, the customer shall submit their technical operating procedures for use in NASA facilities as required by KHB 1710.2D, *KSC Safety Practices Handbook*. Customers are required to submit their procedures to the LSIM at least 55 days prior to first use. The LSIM submits the customer's hazardous procedures to the KSC Safety Office for review and approval. KSC forwards the Safety Office's written approval/comments for these procedures to the customer. KSC requires final approval and publication no later than 10 days before first use.

As required by EWR 127-1, the LSIM also submits spacecraft standalone procedures and spacecraft integrated procedures (mate, encapsulation, launch, etc.) to Range Safety and the LSP. Operations Safety also reviews these procedures.

### **3.5.2 Customer Ground Support Equipment**

The customer provides the necessary special handling equipment (slings, dolly, etc.) and any special test equipment to support their launch site operations. The customer must calibrate, proofload, and attach proofload tags to the equipment before arrival at the launch site; and it should remain this way throughout use. EWR 127-1 and NSS/GO 1740.9B document proofloading requirements. If the customer requires calibration or proofloading action on any customer GSE, they must provide the pertinent drawings and technical documentation. The customer and the LSIM should document potential proofloading requirements in the LSPP.

Storage space in the PPF's/HPF's is limited. Customers may use their assigned space to store flight hardware and GSE until the completion of launch campaign activities. If the customer requires additional space, he is responsible for arranging for storage space off site or for shipping the containers and equipment back to their designated location. Wooden containers are not normally permitted to be stored in a clean work area. Wooden containers that require storage/usage in a KSC facility clean area must be painted with fire-retarding paint and labeled as such.

KSC transports required customer GSE from the processing facilities to the launch complex.

NOTE: All propellant GSE containers shall meet DOT regulation (49CFR171-180 as applicable), or a KSC Safety Waiver must be approved if it doesn't meet DOT regulations. This doesn't apply to transfer panels, just the "tanks".

### **3.6 COMMUNICATIONS**

[<http://vulture.ksc.nasa.gov/main.html>]

#### **3.6.1 Radio Frequency Application/Authorization**

For spacecraft with RF capability, the customer must complete and provide RF applications in accordance with KHB 1860.2B, *KSC Non-ionizing Radiation Protection Program* and KHB 2570.1, *KSC Radio Frequency Spectrum Management Handbook*. There are two types of forms required. One form is required for personnel protection, and the other is for authorization to radiate on base.

##### 3.6.1.1 Personnel Protection RF Authorization Forms

KSC Form 16-450 is used to gather information about the RF transmitter so that the Radiation Protection Officer can utilize this data to calculate what type of clears are required to prevent personnel exposure to RF. KSC Form 16-451 is required to show that the spacecraft personnel are properly trained to operate RF equipment. Forms are also required for personnel protection for other systems, such as lasers (reference section 3.8.3).

##### 3.6.1.2 Radio Frequency Authorization

RF authorization must be obtained from NASA before anyone can turn on a transmitter and radiate. Application for RF authorization can be directly accessed via the World Wide Web at <http://spectrum.ksc.nasa.gov/main.html>, or the customer can request it from the assigned LSIM. RF authorization forms need to be provided to the LSIM so that the LSSP can document this frequency in the mission unique PRD.

##### 3.6.1.3 Scheduling for all RF Operations

All RF transmitters on base are tracked. During certain operations (such as another spacecraft transporting to the launch pad), the USAF may request RF silence. If this occurs, the USAF may ask the customer to stand down, depending on the power of the spacecraft transmitter and signal strength, along with building attenuation. Whenever a transmitter is turned on, it must be properly scheduled in order for RF to be controlled in this manner. Therefore, it is extremely important to inform the CPSM and/or LSIM in advance so that any RF transmissions can be properly scheduled. This also applies when using any facility roof top antennas. NOTE: RF operations at KSC are considered hazardous.

### 3.6.1.4 First Time Turn on of RF Transmitter

The first time a spacecraft transmitter is turned on the Radiation Protection Officer will be present to verify that the calculations performed to set up personnel clears is conservative to protect personnel from RF exposure.

### **3.6.2 Communication Interfaces**

KSC requires that the spacecraft customer communication interfaces to the KSC facilities conform to the standard configurations for that facility. The customer should work with the LSIM and the Mission Communications Engineer to document spacecraft-unique requirements in the LSSP and the PRD.

Off-site access to NASA Science Internet (NSI), Program Support Communications Network, and Program Support Communications Network Internet is available. These systems are for administrative use only and are not recommended for operational data requirements. This service is available via the Payload Operations Network (PON) and supports the IEEE 802.3 Standard. KSC supports transmission control protocol/internet protocol (TCP/IP) and DECNET protocols.

### **3.6.3 Payload-Unique Communication Security**

Refer to guidelines in paragraph 3.9.5 for the unique spacecraft requiring communication security.

## **3.7 A LITTLE ABOUT KSC FACILITIES**

[<http://www.ksc.nasa.gov/elv/tour.htm>]

[<http://www.ksc.nasa.gov/facilities/tour.html>]

Various KSC procedures control and authorize activities in specific NASA facilities. The LSIM provides copies of these applicable procedures to the customer at least 6 months prior to first hardware arrival at KSC. The CPSM, the facility manager, and the LSIM enforce the use/work rules for integration facilities. However, each individual who enters a facility must accept the responsibility to be knowledgeable of, and to abide by, the area rules; and to assist others in maintaining safe and efficient operations. Examples of work rules KSC enforces include clean room training, working at heights, and tool control. For safety reasons, customers in NASA facilities must follow tool control rules. After development by the customer, this plan should be addressed during GOWG's or TIM's. The ELV LSP provides the guidelines at the ELV launch pad. At the CCAFS ELV launch pads, customers must use materials from the KSC/USAF-approved material list, or the appropriate KSC/CCAFS materials group must specifically approve the material. Deluge system training may be required for the HPF activities. Discuss these requirements with the LSIM.

KSC Safety surveys hazardous activities as defined in section 3.8; and provides for response and rescue, if needed, by the emergency response teams.

### **3.7.1 Contamination Control**

KSC documents contamination control at KSC in K-STSM-14.2.1D, with detailed procedures implemented by KCI-HB-5340.1C, *Payload Facility Contamination Control Implementation Plan*, for all NASA spacecraft facilities. To avoid contamination of other spacecraft or of the KSC facilities, the customer has the responsibility to maintain his spacecraft and GSE to a cleanliness level appropriate to the level of the facility in use. If the customer requires more restrictive contamination control than is called out in the KSC plans, then the customer is responsible for providing the spacecraft protection. However, any additional protection the customer provides should be coordinated with and approved by KSC prior to implementation. Periodic walkdowns of the spacecraft and facilities are conducted jointly by KSC and the customer to assure that the appropriate criteria are being met. The LSP defines additional controls for contamination/facility use work rules at the CCAFS launch pads. The LSP provides these details.

### **3.7.2 Certification of Customer Personnel**

For customer personnel performing hands-on processing functions on flight hardware, the spacecraft organization shall provide a description of their training/certification program to the Launch Site Safety Office as part of the spacecraft's Launch Site Safety Plan. This program description shall specify the personnel training required and the certification procedures employed to establish acceptable skill levels for all personnel involved in the ground processing of their spacecraft and its GSE. Only persons certified in the discipline required for that process should perform ground processing.

### **3.7.3 Work Time Policy and Rules**

KHB 1710.2D defines acceptable overtime standards in all KSC facilities. Customer management may establish their own work time policy and rules, which are equivalent to those at KSC, or use the KSC policy while their spacecraft is in process at KSC facilities. The customer provides the LSIM with a copy of their unique work time policy and rules, or advises in writing that the KHB will be used no later than 45 days before hardware arrival at KSC.

Confirmation of compliance may be required during processing. The LSIM makes any request for confirmation of compliance by letter. Upon receipt of such a request, the customer management provides confirmation of compliance in writing back to the LSIM.

The customer also defines the planned work shifts and days (e.g., two shifts 6 days, three shifts 5 days, two shifts 7 days) during processing at the launch site. This



definition includes a plan to remain in compliance with the stated maximum work time requirements. Including contingency shifts and days, as needed, due to problems encountered during the processing. The customer provides this definition in writing to the LSIM not later than 45 days before hardware arrival at KSC. KSC addresses the plan at the GOR.

During launch pad activities, the ELV LSP and EWR 127-1 controls and provides information on work shifts and days.

### **3.7.4 Hurricane Preparedness Activities**

The KHB 1040.1G, *Hurricane Preparation and Recovery Plan*, details the hurricane contingency plans to protect KSC facilities used for spacecraft processing. The plan prescribes preparedness measures, facility securing, and ride-out personnel for designated facilities and operations. A similar plan exists for CCAFS and includes the NASA processing facilities on CCAFS and the launch pads. Additionally, the various LSP's approve plans and procedures to protect the spacecraft and launch vehicle in the event of a hurricane during operations at the launch complexes.

KSC has a generic hurricane plan that will be given to the payload customer for unique payload requirements that need to be added to the plan. The plan should be completed 45 days prior to spacecraft arrival at KSC. Hurricane preparedness is a topic at the GOR.

## **3.8 SAFETY OVERVIEW**

[<http://www.pafb.af.mil/45sw/rangesafety/45swse.htm>]

[<http://aztec.ksc.nasa.gov/ecweb/>]

KSC performs safety surveillance in accordance with KHB 1710.2D for all spacecraft hazardous operations. NASA Safety reserves the right to audit non-hazardous operations at KSC. Any operations requiring work under a suspended load must be approved in accordance with the "NASA Alternate Safety Standard for Suspended Load Operations" contained in appendix B of NSS/GO 1740.9B.

During spacecraft processing in the assigned spacecraft processing facility, the customer must comply with KSC safety policy for any welding, cutting, or other hot work operations. KSC requires special permits even if the customer uses spacecraft-provided GSE. The customer shall advise the LSIM of the planned activity as early as possible, and shall assure that this activity is adequately described in the safety reviews.

### **3.8.1 Fire Deluge Systems (new section)**

All NASA-controlled HPF's contain water deluge systems. KCA-013, *Memorandum of Agreement on Operation of Firex Water Deluge Systems in Payload Processing Facilities*, and KHB 1710.2D establish facility operational policy. All spacecraft customers should be thoroughly aware of these policies.

In the Payload Hazardous Servicing Facility (PHSF) and the Spacecraft Assembly and Encapsulation Facility-2 (SAEF-2), KSC normally turns off the water to the deluge systems at the facility valve(s) to protect the spacecraft from inadvertent activation of the systems. During all processing activities of a spacecraft in these facilities, the spacecraft customer provides a team of personnel that KSC trains in deluge system activation. The facility manager and/or Payload Safety arrange the training. Additionally, during hazardous spacecraft operations (e.g., fuelling operations, pressurizing, ordnance operations, hoisting solid motors or fueled spacecraft), the facility activation valve is manned. During all other operations, KSC requires a fire watch.

If the spacecraft customer elects not to provide the team to perform the fire watch and deluge responsibilities, KSC provides the team as a special service at an additional charge. The request for a KSC team must be documented as a requirement in the spacecraft-unique LSSP. The customer should work the details of these operations during early planning meetings with his assigned LSIM and CPSM, who can also provide additional information on KSC policy and details of the deluge systems.

### **3.8.2 Safety Data Requirements**

The LSIM assists with the safety review process. Comments to the MSPSP can be provided at reviews/meetings, and will be documented in letter(s) from the approving authority. Payloads must conform to EWR 127-1, which requires that the LSP and the spacecraft customer each submit a spacecraft-unique MSPSP. The MSPSP must identify hazardous systems and operations associated with the spacecraft and launch vehicle. These hazards may involve high-pressure lines/vessels, fuels, servicing, explosives, etc. See section 2.5.4 for more on the MSPSP submittal schedule. An approved MSPSP is required prior to payload arrival.

### **3.8.3 Radiation Protection Requirements**

The customer ensures that any spacecraft containing ionizing radiation hazards (e.g., radioactive materials, X-ray devices, particle accelerators) and non-ionizing radiation hazards (e.g., RF/ microwave emitters, laser devices, ultraviolet and infrared light sources) complies with the requirements; and obtains the necessary approvals specified in KHB 1860.1C, *KSC Ionizing Radiation Protection Program*, and KHB 1860.2B, respectively. Payloads containing major radiation sources (e.g., radioisotope thermoelectric generators (RTG's), nuclear reactors/ assemblies, and high-intensity accelerators) are subject to additional control requirements (KHB 1860.1C, appendix D) due to their special nature. Review by the KSC Radiation Protection Officer and/or

Radiation Protection Committee or the CCAFS 45 SW Radiation Protection Officer must be coordinated through the LSIM. An assessment of these hazards is required to assure that personnel are protected; and, when required, to determine the types of clears that must be established to minimize personnel exposure.

### **3.8.4 Safety and Mission Assurance Responsibilities**

KSC performs quality assurance functions for hardware/GSE shipping and receiving. Customers may choose to use their own safety and mission assurance documentation system throughout all activities at KSC; however, customers must provide continuing status of problems (e.g., flight hardware/software or GSE) that potentially constrain mission milestones. In addition, the LSP's provide an approved safety and mission assurance system for integrated spacecraft/launch vehicle operations.

## **3.9 SECURITY OVERVIEW**

The KSC Security Operations Office representative manages the spacecraft security program at KSC. The Security Operations representative reviews all requests submitted through the LSSP for security services, coordinates the KSC/CCAFS security support resources with the LSIM, and implements the requested security.

### **3.9.1 Baseline Security Services**

KSC provides normal security support 24 hours per day, 7 days a week at the perimeter entry points to CCAFS/KSC, and for traffic escort (as defined in KHB 1610.1B) of all flight hardware and oversized loads on KSC/CCAFS roadways. KSC/CCAFS assigns roving security patrols to zones comprised of several facilities for periodic inspections. This includes all facilities for spacecraft operations.

### **3.9.2 Additional Security Services**

KSC provides one security guard per shift at the NASA-controlled processing facilities on CCAFS. The KSC processing facilities are equipped with automated entry control devices augmented with the additional security controls previously described. Any additional security requirements should be documented in the LSSP, and the customer assumes the associated cost.

### **3.9.3 Access Control**

KSC provides access control for all spacecraft operational areas by an automated entry control system. Personnel access is by access control intrusion detection system badge, limited to cleared individuals or those being escorted. KSC encourages customers to request clearances and badge issuance as far in advance of arrival as possible. See section 3.1 for more badge information.

At the ELV launch pads, the base operations contractor controls access to the spacecraft. The LSIM coordinates all security requirements (access list and mission overlay badges) with the customer and the LSP.

### 3.9.4 Special Nuclear Material

This policy is applicable to unique spacecraft containing radioactive materials in radioisotope heater units and/or nuclear reactors/assemblies. The customer coordinates their requirements for special nuclear material accountability, handling, and storage with the LSIM who coordinates with the U. S. Department of Energy (DOE), the KSC Biomedical Operations and Research Office representative, the 45 SW, and the KSC Protective Services Special Nuclear Material accountability representative.

### 3.9.5 Communications Security (COMSEC)

The LSIM coordinates all matters involving COMSEC equipment and keying materials, including the Data Encryption Standard and public key cryptography, and all matters involving the COMSEC Material Control System through the KSC COMSEC Officer (Internal Security Office) in the KSC Protective Services Office. The COMSEC Officer must approve all COMSEC equipment and material receipts, utilization, and transfer. KHB 1610.1B, chapter 402, provides COMSEC policy and procedures as they pertain to KSC.

## 3.10 MEDICAL CERTIFICATION

All customer personnel participating in certain operations (e.g., propellant handling and designated crane operations) must undergo a physical examination. This examination may be provided by the customer's organization if it includes the biomedical requirements (i.e., electrocardiogram, treadmill stress test -- Bruce protocol, laboratory workup, vital capacity, etc.) and applicable KSC forms. The examination report, including the SF 93, *Report of Medical History*, and the SF 88, *Report of Medical Examination*, must be forwarded to the following address:

Supervisor of Occupational Medicine/Environmental Health Services  
Patient Services  
CHS-005  
P.O. Box 21296  
Kennedy Space Center, FL 32815

Forward copies of completed KSC Form 13-116PA, *Health Examination Request/Report*, to the LSIM to initiate KSC review of the examination report. Upon certification, KSC issues a KSC Form 13-121, *Medical Certification*.

## 3.11 COMPUTER NETWORK SUPPORT

[<http://odin.oao.net/enhanced.htm>]

KSC's administrative computer network is available for use by customers upon request through requirements defined in the LSSP. During development of the LSSP, the LSIM provides the customer with a package of material that describes KSC's network capabilities and available services. The customer must complete the applicable forms provided in this package, and submit one for each computer that will be attached to the network and for each person who requires access. These forms must be submitted to the LSIM at least 30 days prior to spacecraft arrival. If a particular user is a Foreign National, their forms must be submitted to the LSIM at least 60 days prior to spacecraft arrival.

The LSIM reviews any requested network services that exceed the existing standard capability installed in the assigned spacecraft facility to determine applicable additional service charges.

### **3.11.1 Standard Network Services**

The PON provides TCP/IP transport between all spacecraft facilities; and provides connectivity to the NSI and the Program Support Communications Network Internet through public networks at KSC. Payload Ground Operations Contractor (PGOC) Network Services provides domain name services support, IP address management, network troubleshooting, plant management, drop installation, and help desk support for the PON. The PON is an administrative network staffed from 8 a.m. to 4:30 p.m., Monday through Friday. It is not to be used for mission or test support, as it is not staffed, maintained, or secured at levels to assure success for those uses. Network Services schedules outages of the PON as necessary to maintain the high standard of service they provide. They send electronic mail notices of these outages to users.

### **3.11.2 Personal Computer/Work Station Support**

The customer provides all personal computer workstations, printers, and related equipment and software to be used at the launch site, including transceivers or other devices needed to adapt customer hardware to the KSC network interfaces. The customer initiates and maintains efforts to identify and address workstation support issues during launch site support planning. The LSIM facilitates coordination of workstation-related issues, including hardware requirements, software requirements, IP addresses, hardware and software configuration, and any other workstation-related issues, with the Network Services Support Team. The goal is to ensure that all spacecraft processing team members can, upon arrival at KSC, connect their workstations to the administrative network and begin operations without delay.

### **3.11.3 File and Print Services**

Print services are available to the NASA Payloads community. Customers can access the existing print servers via guest access. The primary benefit to this access is the ability to share existing printer resources. In order to access the PON servers, the

customer must have local area network manager-compatible client software running TCP/IP protocol on the workstation.

### 3.11.4 Network Security

Inbound access to the PON from remote sites is normally not supported due to security concerns. Exceptions must be requested through the LSIM. All remote computers requiring access through the PON to customer hardware at KSC must be identified to the Payloads Network Support Team through the LSIM at least 30 days prior to the need date. The LSIM works with the customer to provide the necessary forms. The request should include the IP addresses of the remote equipment. All machines must be domain name service registered before access controls will be modified to allow them to connect to KSC.

The PON Account Information Sheet (included in the information package provided by the LSIM) must be filled out by the customer in order for KSC to perform screening that is required per NHB 1620.3, *NASA Security Handbook*. In addition, Foreign Nationals must provide the information that is detailed in NHB 2410.9A, *NASA Automated Information Security Handbook*. The Foreign National visitor's sponsor provides this information to the LSIM who routes it to the KSC Payloads Data Processing Installation Automated Information Security Officer for approval.

For all users, the required information consists of the following:

- a. Nature of Request
  1. Hardware to be accessed
    - a) Specific computer system(s)
    - b) Specific terminal location(s) (complete address, street, city, state, and dial-in access telephone numbers)
  2. Files/Applications to be accessed
    - a) File/Application names
    - b) Level of requested access (read, write, execute, etc.)
    - c) File owner/custodian (name, title, organization)(attach permission, documentation from the data owner and/or application sponsor)
    - d) Sensitivity levels of files, applications systems, and computer systems
  3. Access periods requested
    - a) Commencement date (month, day, year)
    - b) Termination date (month, day, year)
    - c) Justification (for this particular period)
      - 1) Hardware to be accessed
        - a. Specific computer system(s)
        - b. Specific terminal location(s) (complete address, street, city, state, and dial-in access telephone numbers)



b. Justification for Access

1. Exact nature of the assignment requiring access
2. Reasons why hardcopy is not sufficient

c. Security Controls to be Implemented

1. Physical access to facilities and hardware
2. File access (i.e., technical controls in the operating system)
3. Physical, administrative, and/or on-line monitoring of the individual

### **3.12 WASTE MANAGEMENT PROGRAM OVERVIEW**

[<http://sgs.ksc.nasa.gov/sgsweb/frames.html>]

The Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection impose regulations upon KSC/CCAFS to minimize the use of toxic materials, minimize pollution, and manage the disposal of hazardous wastes. KSC has developed specific hazardous waste and biomedical waste management policies and procedures for ground processing at KSC.

KSC imposes responsibility for adhering to its policies and procedures (thereby, adhering to Federal and State regulations) upon each generator of regulated waste. For customer ground processing in KSC facilities, the customer is the generator. KSC has established the following waste management policies and procedures to ensure that the customer identifies, stages, and disposes of wastes that fall under these regulations. As such, KSC and the customer are both responsible for adhering to these regulations.

The customer designates an environmental POC 12 months prior to launch. This person acts as the single POC for waste management issues, and ensures he manages the waste properly at the point of generation. This person is also responsible for coordinating with all involved organizations for waste handling. Upon spacecraft arrival, KSC requests that a back up be assigned to ensure that the customer can be contacted at the assigned facility.

The customer ensures that the processing personnel working in KSC facilities are properly trained in hazardous waste management and/or biomedical waste handling, whichever is appropriate for the processing flow in accordance with EPA regulations. The customer must notify the LSIM, in writing 30 days before spacecraft arrival, that their personnel are appropriately trained. KSC can arrange for on-site training if the customer desires. Upon arrival at the KSC facility, a waste management familiarization course will be provided to the applicable customer personnel.

The following documents provide specific requirements to identify hazardous materials brought on-site, returned to the customer off-site, and hazardous waste generation on-site:

KHB 1870.1	<i>KSC Sanitation Pollution Control Handbook</i>
KHB 8800.6	<i>KSC Environmental Control Handbook</i>
KHB 8800.7C	<i>Hazardous Waste Management Handbook</i>
KMI 1800.2C	<i>KSC Hazard Communication Program Handbook</i>
KMI 1840.3	<i>KSC Industrial Hygiene Program</i>

Customers must manage inventory and show accountability of all hazardous substances in accordance with the requirements of KHB 8800.6. At CCAFS launch complexes, customers should use materials from the approved material list, or obtain approval from the materials committee to use other materials.

### **3.12.1 Hazardous Waste**

The first step in controlling hazardous waste is to identify the potential sources before spacecraft arrival at KSC. The customer completes a Process Waste Questionnaire (PWQ), KSC Form 26-551, to identify any chemicals, substances, or processes that will be used at KSC that could generate waste. This form must be submitted to the LSIM 60 days prior to hardware arrival at KSC. KSC personnel review these forms and prepare a disposal area in the KSC facility to appropriately handle the wastes identified by the customer. The customer maintains this disposal area, called a satellite accumulation area (SAA), once they arrive at the KSC/CCAFS facility. It is the customer's responsibility to ensure that the SAA containers match the type and quantity of waste being produced. Mixing of miscellaneous wastes in the same container is not allowed and could create a safety hazard. All waste must be segregated according to compatibility. KSC is responsible for disposing of the waste deposited in the SAA containers.

KSC requires a Material Safety Data Sheet (MSDS) for each type of chemical or substance present in the KSC/CCAFS facility. The customer submits the MSDS to the LSIM prior to arrival at KSC, and the customer must maintain a copy in the facility while the chemical or substance is in the facility (complies with 29 CFR 1910.1200, *OSHA Hazard Communication Standard*).

### **3.12.2 Biomedical Waste**

The customer submits a PWQ to identify all biomedical waste types and quantities that have the potential to be generated at KSC. There are two categories of biomedical waste: 1) sharps, which must be disposed of in hard plastic containers; and 2) non-sharps, which can be disposed of in red biomedical bags or cardboard boxes identified with the biohazard symbol in accordance with Florida guidelines and DOT CFR 49.

KSC provides the containers based upon the information provided by the customer on the PWQ's. The customer must label all containers, upon their use, with the following information: 1) generator name/organization, 2) date, 3) description of waste, 4) and the location of generation. Upon notification from the customer, KSC arranges for disposal of the labeled waste.

Additionally, the customer must control activities and operations which may expose ground operations personnel to potentially infectious materials in accordance with the requirements provided in 29 CFR 1910.1030, *Bloodborne Pathogen*. A copy of the Exposure Control Plan, required by this Standard, must be provided to the LSIM 30 days before spacecraft arrival for submittal to the NASA KSC Medical Officer for review.

### **3.12.3 Waste Minimization**

Federal regulations require that chemicals be tracked from receipt to consumption in an effort to minimize the amount or toxicity of wastes; therefore, the customer is required to complete KSC Form 28-185, *Emergency Planning Community Right-to-Know (EPCRA) Chemical Tracking*. This form tracks the amount of chemicals brought to KSC, how much was used, and how much was left after the processing flow. The intent is to have the generator order only the amount needed for the intended processes, eliminating excess unused materials.

Several things can be done to minimize waste, such as substituting non-hazardous raw materials; keeping a commodity in pure form; and modifying procedures to reduce the volume or toxicity of materials used. All of these efforts help to reduce waste disposal costs and pollution. KSC personnel are available for consultation on this issue, as needed. Prior to customer departure from KSC, the customer must complete, submit, and obtain KSC approval on their EPCRA sheet(s). This provides KSC with the total amount of materials used and the disposition of unused materials. The handling of unused materials is the responsibility of the customer. The LSIM coordinates this effort with the customer.

## **3.13 TRANSPORTATION REQUIREMENTS OVERVIEW**

Prior to arrival at KSC, the customer designates a transportation contact. This person acts as the single POC for transportation issues, and works with the LSIM to schedule applicable KSC support.

### **3.13.1 Arrival at KSC/CCAFS Station**

Coordinate all shipments with the LSIM in advance. The LSIM coordinates the appropriate delivery and property transfer activities with the KSC/CCAFS Transportation Office. The customer needs to provide the following information for incoming shipments:

- a. date of shipment
- b. number of pieces and dimensions of major items
- c. shipment weight
- d. method of shipment
- e. estimated shipment arrival
- f. airway bill number (for air shipments) or bill of lading number
- g. hazards associated with the shipment (oversize load, materials, chemicals, ordnance, batteries, high-pressure gas, ionizing and non-ionizing sources, radioactive, etc.)
- h. special support required (crane, large forklift, etc.)
- i. radar status (on or off) during transport

As previously stated, the LSIM/CPSM coordinates and schedules any KSC support required to off-load the shipment. KSC places all items in the integration area of the PPF, unless otherwise specified by the customer. If the customer requires any off-site storage of shipping containers (refer to section 3.5.2), he must complete the arrangements and coordinate with the LSIM before shipment of hardware/GSE to KSC.

For both domestic and international shipments, use the following shipping address:

NASA Transportation Officer  
C/O PGOC Warehouse, Building M6-698  
Kennedy Space Center, FL 32899

Deliver to:

Building Name (PPF) and Building Number (M7-XXXX)

Notify: CPSM or LSIM Name, Mail Code, and Phone Number (867-XXXX)

Clearly Mark for:

Your Mission: Spacecraft Name, Experiment Name, and ELV Number

CPSM's Name or Customer's Resident Office Representative

Special Handling Instructions, Customer/Principal

Investigator/Experimenter/LSIM Name

Consign all international shipments to the above address. KSC cannot interface with customs if shipments are consigned to freight forwarders or brokers. Failure to comply can cause critical shipment delays.

The LSIM meets the shipment at the PPF to ensure appropriate off-loading support is provided.

### **3.13.2 Getting Through Customs**

Duty-free shipments into KSC cannot be guaranteed unless KSC arranges agreements and certifications between U.S. government agencies, NASA, and the customer prior to its arrival in U.S. Customers must coordinate all required licenses, permits, and/or

Admission temporary/Temporary Admission (ATA) Carnets for shipments arriving in the U.S. U.S. Customs requires the following information for each commodity to clear the shipment:

- a. full description (spell out acronyms)
- b. country of origin/manufacture (U.S. or foreign)
- c. end use (what it will be used for)
- d. specify if there is a NASA-to-country agreement
- e. weight (without packaging) in kilograms
- f. fair market value (U.S. dollars)
- g. ultimate destination
- h. name and telephone number of Customs broker and/or freight forwarder (if any) for recipient
- i. full shipping address for recipient--no post office boxes
- j. name and telephone number of recipient
- k. reasonable date required at destination
- l. specify if there is a NASA-issued Duty Free Entitlement certification letter

Show mission name and/or number and include description of contents, part numbers, serial numbers, etc. English language invoices and dollar amounts are mandatory. A commercial invoice should be used. A Pro Forma invoice can be used if a commercial invoice is not available. An ATA Carnet should be avoided, if at all possible, because they are valid only for one year and are very difficult to extend if the mission slips. As mentioned, KSC uses Port Canaveral Florida Customs Office. If the customer ships to another port of entry (i.e., Savannah, Georgia, or Miami, Florida), he needs to provide a bonded carrier to transport the shipment to KSC where Port Canaveral Customs clears the shipment.

### **3.13.3 On-Site Transportation Support**

The customer submits all planned on-site transportation requirements to the LSIM. The LSIM documents special requirements in the LSSP; some requirements may necessitate an additional service charge. The LSIM interfaces with the designated customer transportation contact to schedule the required support. Unplanned transportation requirements may necessitate an additional service charge.

Most types of flight hardware require a security escort, which is scheduled by the LSIM: 1) oversize loads (wider than 3 m (10 ft)), and 2) slow speeds (less than 56 km (35 mi) per hour). KSC Security restricts transportation involving security escorts to "off-peak" traffic hours. In other words, escorted hardware cannot be on the main roadways

during the peak traffic hours of 6-8 a.m., 3-5 p.m., and 11 p.m. - 1 a.m., Monday through Friday.

### **3.13.4 Departure from KSC**

KSC can provide outgoing shipment support, as requested by the customer. As the responsible party for outgoing shipments, KSC must inspect the items prior to packing and prefers to pack the items for shipment.

The customer provides the following information for outgoing KSC-generated shipments:

- a. customer billing information and/or freight carrier account number
- b. desired shipment arrival date
- c. number of pieces
- d. fair market value of each piece
- e. type--flight hardware or GSE and full description of each commodity (spell out acronyms)
- f. weight
- g. desired method of shipment
- h. hazards associated with the shipment (oversize load, hazardous materials, chemicals, ordnance, batteries, high-pressure gas, ionizing and non-ionizing sources, radioactive, etc.)
- i. manufacturer's MSDS and/or Competent Authority Approval for each hazardous commodity
- j. special support required (crane, large forklift, etc.)

The customer must be present to physically identify all hardware items to the designated contractor transportation representative prior to packing.

### **3.13.5 Departing International Shipments**

The customer must provide the LSIM with the following information for each commodity being shipped in order for KSC to classify the items, arrange for U.S. Customs clearance, and tender the shipment to the freight carrier:

- a. full description (spell out acronyms) including material(s) used in manufacturing (steel, aluminum, titanium, etc.)
- b. Are any of the items nuclear hardened?
- c. country of origin (U.S. or foreign)

- d. end use (what it will be used for)
- e. specify if there is a NASA-to-country agreement
- f. weight (without packaging) in kilograms
- g. fair market value (U.S. dollars)
- h. ultimate destination
- i. name, address, telephone number, and POC for Customs broker at destination for recipient, if known
- j. name, address, telephone number, and POC for freight forwarder, if applicable
- k. full shipping address (no post office boxes) for recipient with POC and phone number
- l. name and telephone number of recipient
- m. reasonable date required at destination
- n. manufacturer's MSDS and/or Competent Authority Approval for each hazardous commodity
- o. Are the licenses, permits, and/or ATA Carnets covering the shipment? If so, provide copy or original, as applicable.
- p. Were the items previously imported into the U.S? If yes, provide date of importation, port of entry, and/or copies of import paperwork.
- q. name of payload
- r. scheduled or actual flight date and spacecraft name

Due to technology and software transfer regulations, KSC requires detailed information on computer hardware and software. Specify whether software is off-the-shelf or unique. If unique, additional information may be required.

The LSIM typically requests the classification data (item 1 above) from the customer upon receipt of their shipment for movement. The customer will need to provide this information in order to ship their goods from KSC. KSC requires the remainder of the information at least 3 weeks before planned shipment. If the goods require a U.S. government export license and/or permit, which the customer has not already obtained, the shipment will be held until such license or permit is obtained.

Prior to departure of payload customer personnel from KSC, the customer-designated transportation contact should assure that all relevant transportation matters are resolved.

### **3.13.6 Shipment Tips**



Adherence to the following items will facilitate prompt delivery to/from KSC:

- a. Coordinate all shipments with the LSIM.
- b. Identify any off-loading/loading support requirements (forklifts, cranes, etc.) to the LSIM so he can schedule support.
- c. Ensure proper shipping documents accompany all shipments or hand-carried items.
- d. Ensure all containers bear proper marking, as stated above.
- e. Paint wood containers, intended for retention in clean work areas, with fire retardant paint; and conspicuously mark these boxes "flame retardant paint."
- f. Provide all wood containers with 10.2 cm (4 in) skids for ease in forklift/pallet jack operations.
- g. Use only clean room-compatible packing materials in containers that will be located in clean processing areas.
- h. Separate licensable and non-licensable items for shipment (do not co-mingle in the same container).

## **SECTION 4. GO: LAUNCH SITE PROCESSING**

The spacecraft processing flow consists of customer processing activities in the PPF, hazardous processing activities, and pad activities. The following subsections describe the processing flow, and figure 4-1 shows a typical ELV spacecraft ground processing flow.

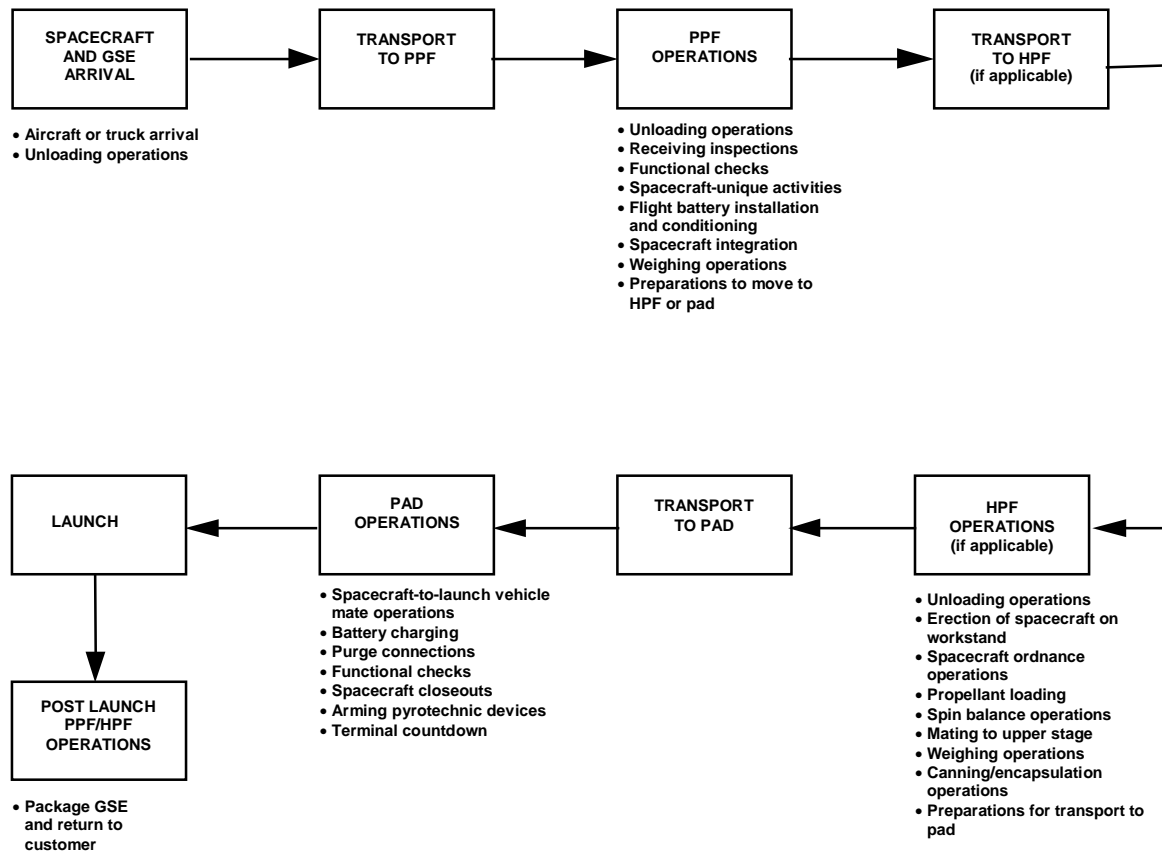
### **4.1 PAYLOAD PROCESSING FACILITY ACTIVITIES**

In assigning PPF and HPF space, KSC primarily considers the availability of their facilities, the size of the spacecraft, the planned hazardous activities, and the cleanliness requirements of the spacecraft. Additionally, KSC considers the floor space requirements for the GSE, such as control room items. KSC has limited office space within their facilities, but they normally provide about 30 desk spaces per spacecraft. For more details on facilities, check out the facility specific handbooks listed in section 2.4.

Customers assigned to a PPF may use their space to store flight hardware and GSE until the completion of postlaunch activities. If the customer requires any additional space, he must arrange and pay for storage space off-site KSC, or ship the containers and equipment back to their place of origin.

The customer transports the spacecraft to KSC/CCAFS (depending on the assigned PPF) in customer-provided shipping containers. The customer defines the mode of transportation (typically a surface carrier, aircraft, or barge). The customer and the LSIM define and negotiate any support required for off-loading at KSC/CCAFS during development of the LSSP. Upon arrival at KSC, the spacecraft and associated GSE will be delivered to the assigned PPF. KSC/CCAFS provides transportation, handling, and security support from arrival through delivery to the appropriate PPF/HPF. The LSP provides transportation from the PPF/HPF to the pad.

The customer has prime responsibility for spacecraft assembly, test, and servicing during the build-up and checkout of the spacecraft in the PPF/HPF. The customer coordinates test activities and required support with the assigned LSIM/CPSM who schedules the agreed support. Generally, KSC provides facility access two shifts per day, 5 days per week. Due to limited resources, KSC provides support to customer operations for one shift per day, 5 days per week, with additional shifts scheduled in advance as required to meet customer requirements and launch schedules.



**Figure 4-1. Typical Spacecraft Ground Processing Flow**

Typical processing activities at the PPF include the following:

- a. receiving and inspection
- b. post-ship functional tests
- c. GSE and spacecraft build-up
- d. calibration
- e. subsystem/system testing
- f. non-hazardous servicing

Certain safety-controlled operations, such as pressure-vessel leak tests or the installation of category B ordnance items may be performed in the PPF. However, if the assigned PPF is non-hazardous, KSC requires relocation to a HPF for a hazardous operation such as fueling. If it is necessary to transfer to an HPF, KSC transports the spacecraft. If the customer's spacecraft does not require hazardous processing, the ELV LSP transports the spacecraft to the pad.

## **4.2 HAZARDOUS PROCESSING FACILITY ACTIVITIES**

Upon completion of non-hazardous processing, the spacecraft begins hazardous operations at the HPF. KSC assigns the PPF/HPF during development of the LSSP. As stated, the customer is responsible for performing the hazardous operations in the HPF (after procedure approval by the KSC Safety Office), and for coordinating test activities and required support with the assigned LSIM/CPSM. KSC schedules and provides the agreed-upon support. KSC protects all HPF's with water deluge systems. See section 3.8 in this Guide for further information on deluge systems. Typical HPF operations include the following:

- a. ordnance installation
- b. liquid propellant loading
- c. pressurization operations
- d. solid rocket motor operations
- e. upper stage operations
- f. spacecraft spin balancing

Upon completion of the hazardous processing operations in the HPF, the ELV LSP prepares the spacecraft for transport to the launch pad.

### **4.2.1 Ordnance Storage Area Operations**

Ordnance that is not installed in the spacecraft upon shipment to KSC must be stored by the 45 SW contractor until scheduled for ordnance activities. During development of the LSSP, the customer defines any spacecraft ordnance storage requirements. The customer provides the procedures to test and inspect all ordnance items. After approval, the customer performs these procedures in the appropriate spacecraft ordnance processing facility.

NOTE: KSC facilities are not approved for storing ordnance; therefore, when ordnance is requested from Ordnance Services, it must be installed by the end of that day or returned promptly to Ordnance Services.

Upon arrival at KSC/CCAFS, the 45 SW contractor transports un-installed ordnance. The LSIM schedules test dates and delivery of the ordnance to the facility with the 45 SW contractor. If the customer chooses to ship ordnance to the CCAFS, he should coordinate with the LSIM and use the following address:

Sverdrup CCG  
Ordnance Service (72905)  
Cape Canaveral Air Force Station, FL 32815

Deliver to:  
Ordnance Manager  
Phone: (321) 853-7951, Fax: (321) 853-3221

Clearly Mark for:  
Your Mission: Spacecraft Name, Experiment Name, and ELV Number  
LSIM's Name or Your Resident Office Representative  
Special Handling Instructions  
Phone: (321) 867-XXXX, Fax: (321) 867-XXXX

### 4.3 PAD ACTIVITIES

Prior to spacecraft delivery to the pad, the LSP performs launch vehicle activities at the pad. Typical activities include the following:

- a. launch vehicle erection and checkout by ELV LSP
- b. T-0 umbilical lines validation by ELV LSP with customer observation
- c. integrated procedure review and approval by all participants

When the spacecraft arrives at the base of the pad, the LSP hoists it to the top of the launch tower spacecraft level and mates it to the launch vehicle. During MIWG's/GOWG's, the customer defines the activities required at the pad to ready the

spacecraft for launch. The ELV LSP manages the spacecraft integration activities at the pad with NASA technical insight and approval. Typical integrated operations at the pad include the following:

- a. Erect and mate spacecraft (un-can, install fairing around spacecraft—Delta only).
- b. Cable-up blockhouse GSE to the spacecraft.
- c. Conduct spacecraft functional tests.
- d. Charge spacecraft batteries.
- e. Arm spacecraft ordnance.
- f. Participate in countdown and launch.

The customer participates in interface verifications with the launch vehicle, launch rehearsals, and the electrical checks (such as power on/off stray voltage checks) to verify spacecraft compatibility to the launch vehicle. Approval for conducting unscheduled spacecraft activities is the result of a real-time decision involving the program participants. The customer provides time estimates for those activities that may impact the launch vehicle processing or the launch schedule.

#### **4.3.1 Launch and Mission Support**

The customer and the LSIM define launch and mission activities during development of the LSSP. Typical support requirements include the following:

- a. use of the MDC
- b. routing spacecraft telemetry back to the designated Satellite Operations Control Center during countdown
- c. NASCOM 2000 after launch to support on-orbit flight operations

#### **4.3.2 Post Launch Support**

The customer and the LSIM define support required postlaunch during development of the LSSP. Typical requirements involve transportation of GSE from the blockhouse, HPF, PPF, or launch pad to the departure point.

### **4.4 A WORD ABOUT CONTINGENCIES**

Special consideration should be given to contingency situations such as emergency off-load of propellants, scrub turnaround, and launch termination. The customer must develop a written plan and procedures for input to contingency operations. For launch delays that require removal of the spacecraft from the ELV, the sequence of flow is typically the reverse of the installation sequence.

The LSIM and the customer identify and define support required in case of contingencies during development of the LSSP.

**APPENDIX A. ABBREVIATIONS AND ACRONYMS**

45 SW	45 Space Wing
ATA	Admission Temporaire/Temporary Admission
CCAFS	Cape Canaveral Air Force Station
cm	centimeter
COMSEC	Communications Security
COTR	Contracting Officer's Technical Representative
CPSM	Customer Processing Support Manager
DECNET	Digital Equipment Corporation Network
DOE	Department of Energy
DOT	Department of Transportation
EIS	Environmental Impact Statement
ELSA	Emergency Life Support Apparatus
ELV	Expendable Launch Vehicle
EPA	Environmental Protection Agency
EPCRA	Emergency Planning Community Right-to-Know
EWR	Eastern and Western Range Regulation
FRR	Flight Readiness Review
GOR	Ground Operations Review
GOWG	Ground Operations Working Group
GSE	Ground Support Equipment
HPF	Hazardous Processing Facility
IE	Integration Engineer
in	inch
IP	Internet protocol
ITL	integrate, transfer, and launch
KHB	Kennedy Handbook
km	kilometers
KMI	Kennedy Management Instruction
KSC	John F. Kennedy Space Center
KSCAP	Kennedy Space Center Area Permit
LMCM	Launch Management Coordination Meeting
LRR	Launch Readiness Review
LSIM	Launch Site Integration Manager
LSM	Launch Services Manager
LSP	Launch Service Provider
LSSE	Launch Site Support Engineer
LSSP	Launch Site Support Plan



**ABBREVIATIONS AND ACRONYMS** (continued)

m	meters
MDC	Mission Directors Center
mi	miles
MIM	Mission Integration Manager
MIT	Mission Integration Team
MIWG	Mission Integration Working Group
mm	millimeters
MPPF	Multi-Payload Processing Facility
MSDS	Material Safety Data Sheet
MSPSP	Missile Systems Prelaunch Safety Package
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communication Network
NHB	NASA Handbook
NSI	NASA Science Internet
O&C	Operations and Checkout Building
OSHA	Occupational Safety and Health Administration
PGOC	Payload Ground Operations Contractor
PHE	Propellant Handlers Ensemble
PHSF	Payload Hazardous Servicing Facility (a PPF/HPF)
POC	point of contact
PON	Payload Operations Network
PPF	Payload Processing Facility
PRD	Program Requirements Document
PRP	Personnel Reliability Program
PWQ	Process Waste Questionnaire
RF	Radio Frequency
RTG	Radioisotope Thermoelectric Generators
SAA	Satellite Accumulation Area
SAEF-2	Spacecraft Assembly and Encapsulation Facility 2
SLC	Space Launch Complex
TAA	Temporary Area Authorization
TCP	Transmission Control Protocol
TIM	Technical Interchange Meeting
U.S.	United States
USAF	United States Air Force
VPF	Vertical Processing Facility

## APPENDIX B. REQUIREMENTS INDEX

Table B-1 provides the customer with a quick reference guide to the requirements presented in this document. Refer to the sections of this document and the referenced documents for additional details.

**Table B-1. Customer Requirements Index for ELV Spacecraft**

REQUIREMENT	SECTION NO./ SOURCE DOC.	CUSTOMER ACTION REQUIRED	TIME FRAME TO SUBMIT OR PERFORM
<b>SECURITY AND BADGES</b>			
Area permit requests	3.1.4, KHB 1610.1B	Complete training/ screening under unescorted access PRP and submit KSCAP application	6 months before visit
Visit accreditation requests	3.1	Submit data and forms	U.S. Citizen: 2 weeks before arrival.
	3.1	Submit data and forms	Foreign National: 45 days before arrival at KSC
Special security requests	3.9, KHB 1610.1B	Submit unique security service requirements	14 months before launch for inclusion in LSSP
COMSEC requests	3.9.5, KHB 1610.1B	Submit COMSEC requirements	14 months before launch for inclusion in LSSP
<b>TRAINING AND PERSONNEL CERTIFICATION</b>			
Medical certification for operations	3.10	Undergo physical examinations/submit required forms to KSC	30 days prior to special training at KSC
Training/certification	3.2	Submit requirements	30 days prior to need date
Camera passes for KSC facilities	3.3	Submit request for camera passes and complete training to Customer Services Rep	2 weeks before operation
<b>HARDWARE DESCRIPTIONS AND CERTIFICATIONS</b>			
Standalone procedure development	3.5, 3.5.1, KHB 1710.2D	Submit standalone procedures	At least 55 days before first use
Proofload/calibration certifications	3.5.2, EWR 127-1	Proofload and calibrate equipment – Apply tags	Prior to equipment arrival
GSE used during ground processing	3.5.2	Provide description of GSE	14 months before launch for inclusion in LSSP
<b>CONTINGENCY PLANS</b>			
Contingency operations such as launch delay,	4.4	Submit written plan and provide inputs to KSC	Begin 90 days before launch to identify need and prepare

REQUIREMENT	SECTION NO./ SOURCE DOC.	CUSTOMER ACTION REQUIRED	TIME FRAME TO SUBMIT OR PERFORM
scrub turnaround.		procedures	procedures
Hurricane plan	3.7.4, KHB 1040.1G	Submit contingency requirements or unique hurricane plan	14 months for inclusion in LSSP or unique plan 45 days before arrival
<b>SAFETY</b>			
EWR 127-1 Tailoring	EWR 127-1	Identify potential non-compliances	PDR
Safety data	2.5.4, EWR 127-1	Submit preliminary MSPSP	Post-PDR and Post-CDR
Safety certification	2.5.4, EWR 127-1	Submit final MSPSP	75 days before spacecraft arrival
Customer waste management single POC	3.12	Appoint a single POC regarding waste management	12 months before launch
Hazardous materials/waste management	3.12, 3.12.1, 3.12.2, 3.12.3	Submit a list of all materials being delivered to KSC facilities	60 days before material arrival
		Submit PWQ for each waste producing substance and process	60 days before material arrival
		Provide MSDS for each hazardous material (including ordnance items)	60 days before material arrival
Waste management	3.12	Submit letter verifying personnel are trained in waste management	30 days before arrival
Permits and authorizations--welding/cutting/hot work	3.8, KHB 1710.2D for facilities	Submit permit applications.	1 week before operation
<b>OPERATIONAL PLANS</b>			
LSSP and PRD	2.3, 2.2.3	Submit inputs for processing, testing, and support requirements for LSSP, L-24 months and PRD, L-19 months	KSC releases Preliminary LSSP at L-14 months and Baseline at L-10 months; PRD at L-10.5 months
Plans and schedules	2.2.1	Submit plans and schedules for in-plant integration and testing	6 months prior to spacecraft delivery
Work time plans and policies	3.7.3, KHB 1710.2D	Submit plan for work shifts and days	45 days before spacecraft arrival
Tool control plan	3.7	Submit unique tool control plan	60 days before spacecraft arrival
Contamination control	3.7.1, K-STSM-14.2.1D, KCI-HB-5340.1C	Submit unique requirements if greater than normal cleanliness	14 months before launch for inclusion in LSSP
<b>NETWORK INTERFACE REQUIREMENTS</b>			
Network connection	3.11	Submit forms	30-60 days before arrival

REQUIREMENT	SECTION NO./ SOURCE DOC.	CUSTOMER ACTION REQUIRED	TIME FRAME TO SUBMIT OR PERFORM
request/account information			
<b>RADIATION CONTROL</b>			
RF utilization	3.6.1, KHB 2570.1	Submit required forms	4 months before arrival
Radiation protection	3.8.3, KHB 1860.1C, KHB 1860.2B	Complete required forms/obtain necessary approvals	1 year before arrival
Special nuclear material used in RTG's and in nuclear reactors/assemblies	3.9.4	Coordinate requirements with DOE, KSC Biomedical, 45 SW, and KSC Protection Services	3 years before launch